Connecticut Department of Energy and Environmental Protection

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

Public Informational Meeting

Improvements to Bashan Lake Dam
DEEP Dam No. 4113
East Haddam, Connecticut

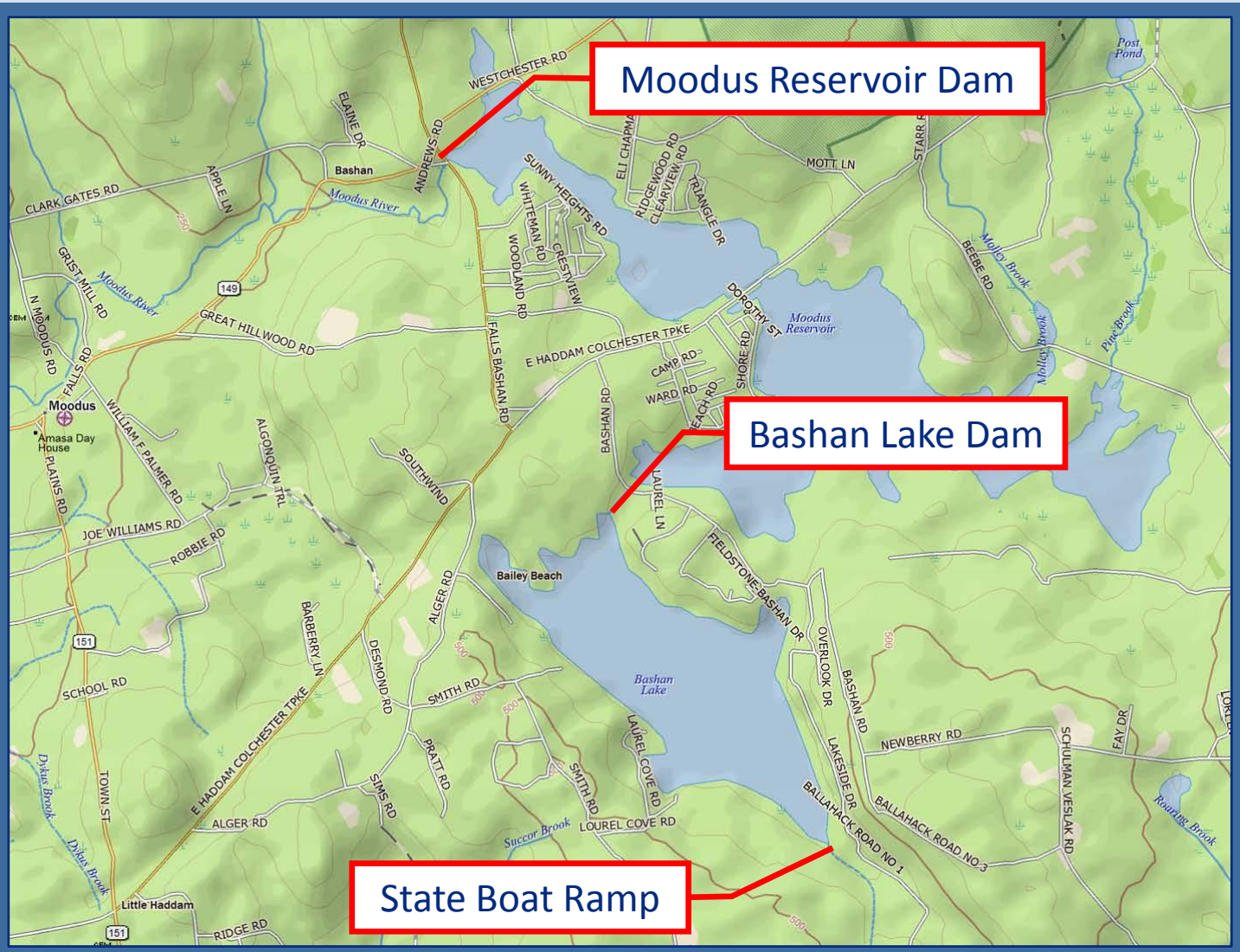
June 27, 2013
WMC Consulting Engineers, Newington, CT
East Haddam Grange Hall

Connecticut Department of Energy and Environmental Protection

Bashan Lake Dam

Connecticut Department of Energy and Environmental Protection

Project Location



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DEEP Responsibilities

- Maintain State-owned dams (eg, Bashan) in a safe condition
- Ensure that all dam owners (both State and private) maintain their dams in a safe condition

Key Personnel

DEEP, Inland Water Resources Division

Cheryl Chase, Director

Jennifer Perry, Supervising Environmental Analyst

Dan Biron, Senior Environmental Analyst

WMC Consulting Engineers

Steve McDonnell, Vice President

Dam History

- A smaller natural lake probably existed prior to the construction of the original dam
- First dam originally constructed circa 1734 to provide power for saw and grist mill operations
- Present dam constructed around 1900, raising lake levels ±16 feet
- Around 1939 upstream stone masonry walls covered with shotcrete (Gunite) to reduce seepage through dam. Photos show cofferdam between two small islands located at mouth of northerly cove.

Dam History

- Around 1966 dam ownership transferred from Moodus Reservoir Company to State of Connecticut
- June 1982 flood overtopped dam, causing some damage
- 1983 State repaired dam. Lake levels down ±16 feet during repairs.
- March 2010 flood overtopped dam, no damages

Terminology

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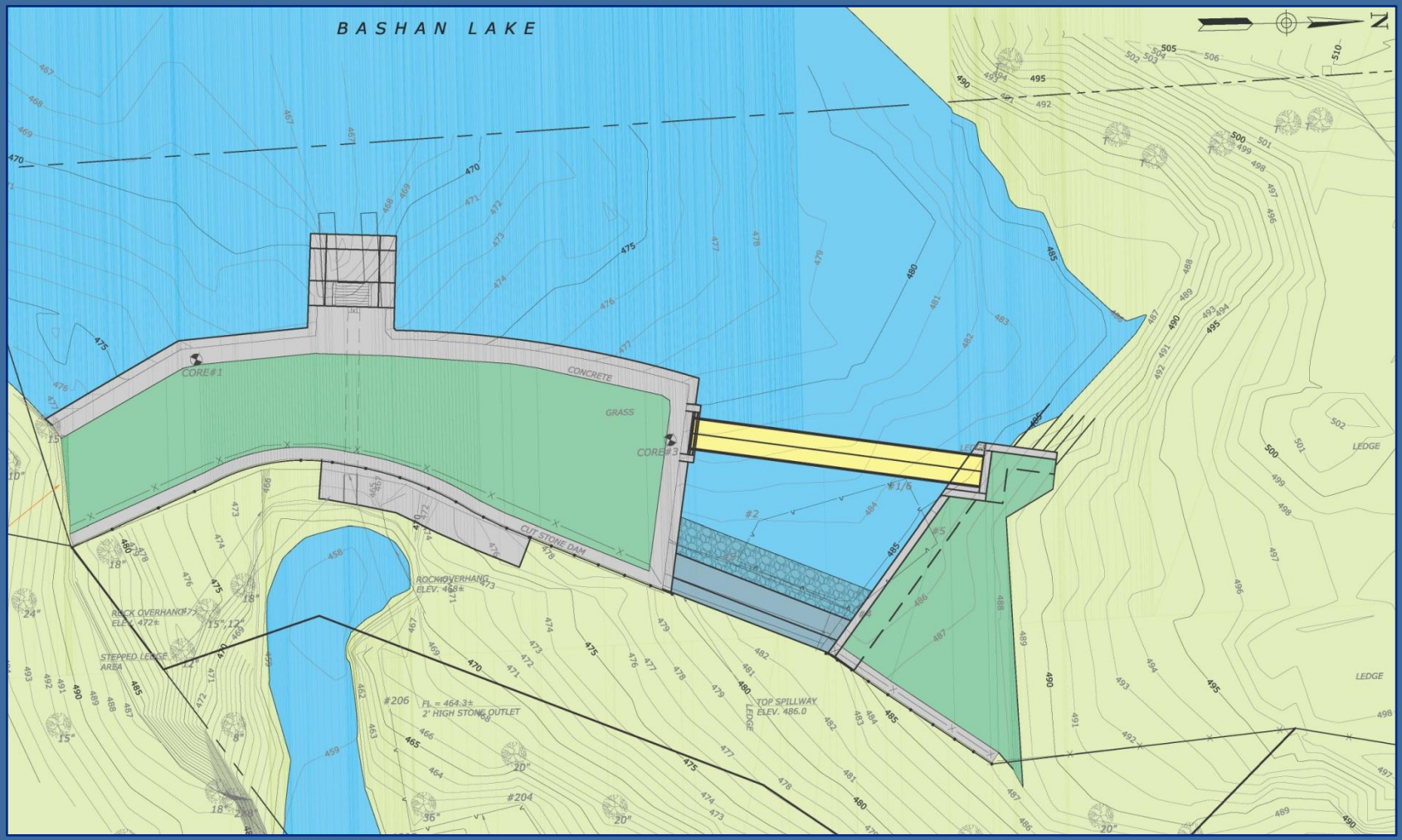
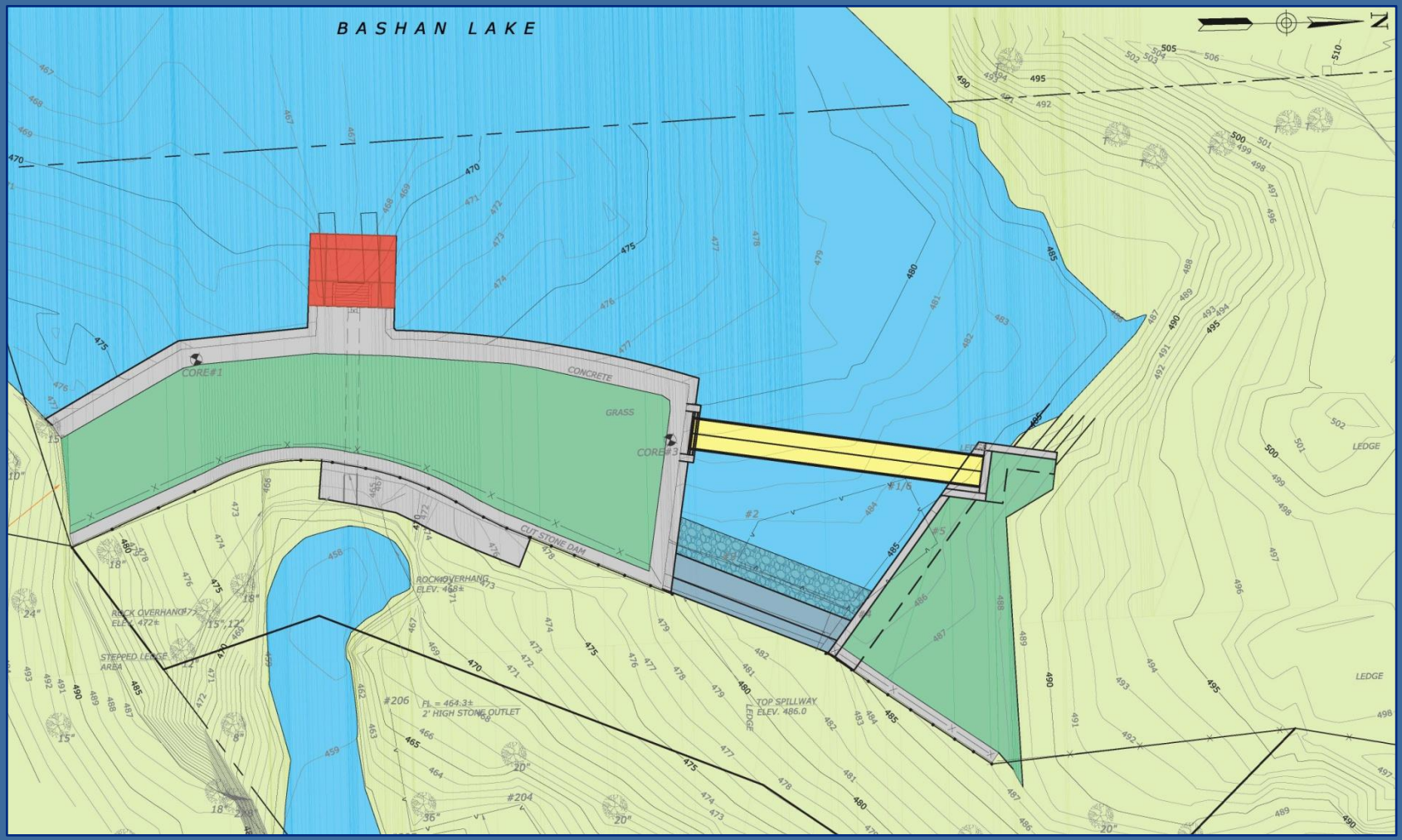
Proposed Major Repair Components

- Replace existing gate structure

Replace Gate Chamber



Replace Gate Chamber



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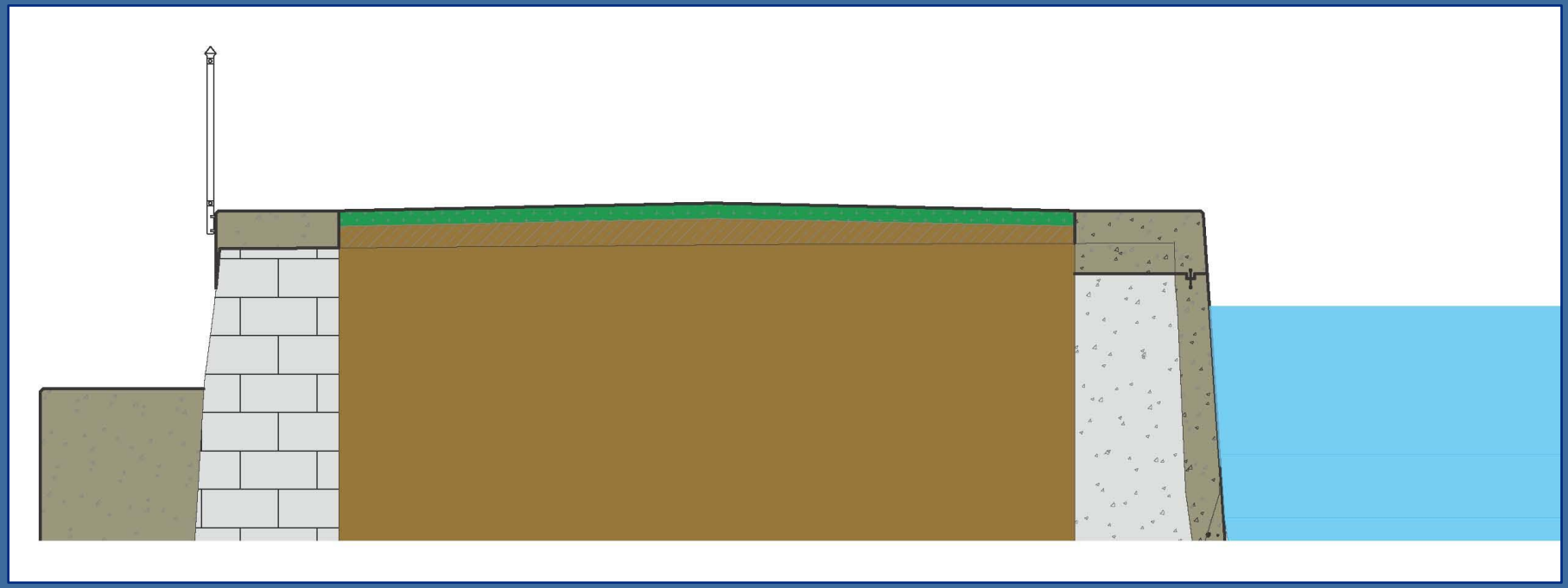
Existing Gate Chamber (1983)

New Moodus Reservoir Gate Chamber

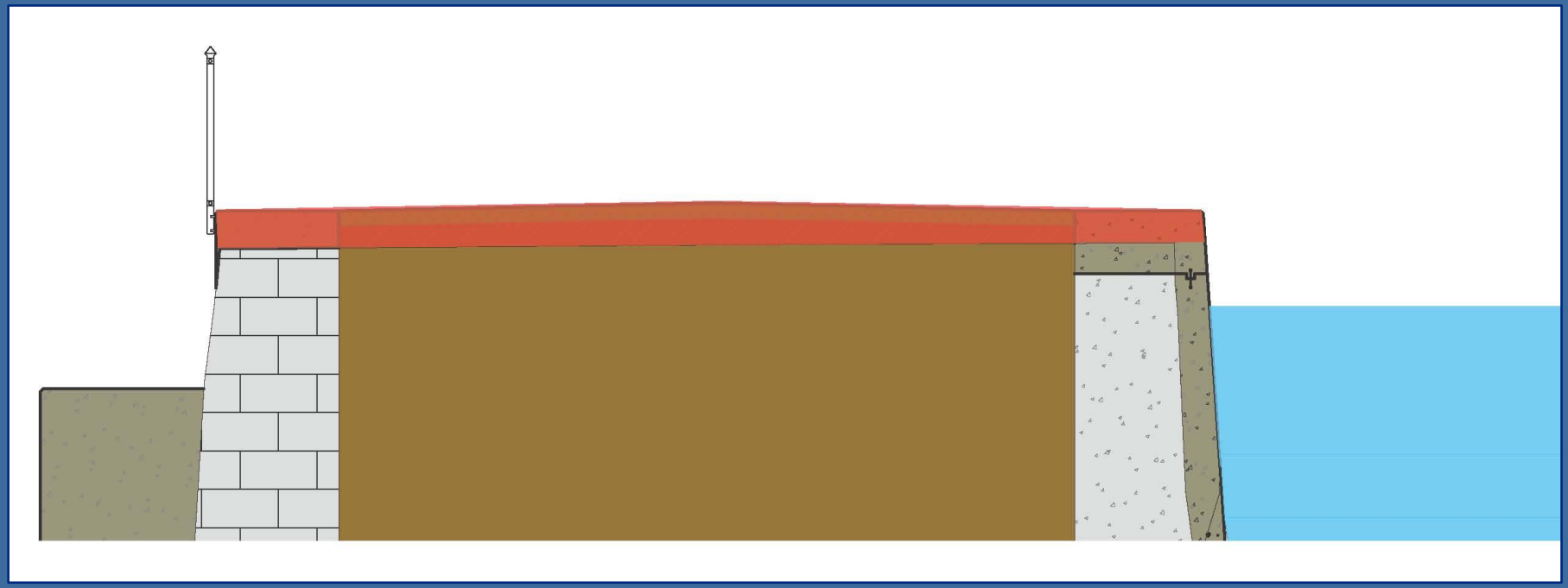
Proposed Major Repair Components

- Replace existing gate structure
- Raise dam embankments one foot to provide one foot of overtopping freeboard for the 100 year design flood

Raise Embankments One Foot



Raise Embankments One Foot

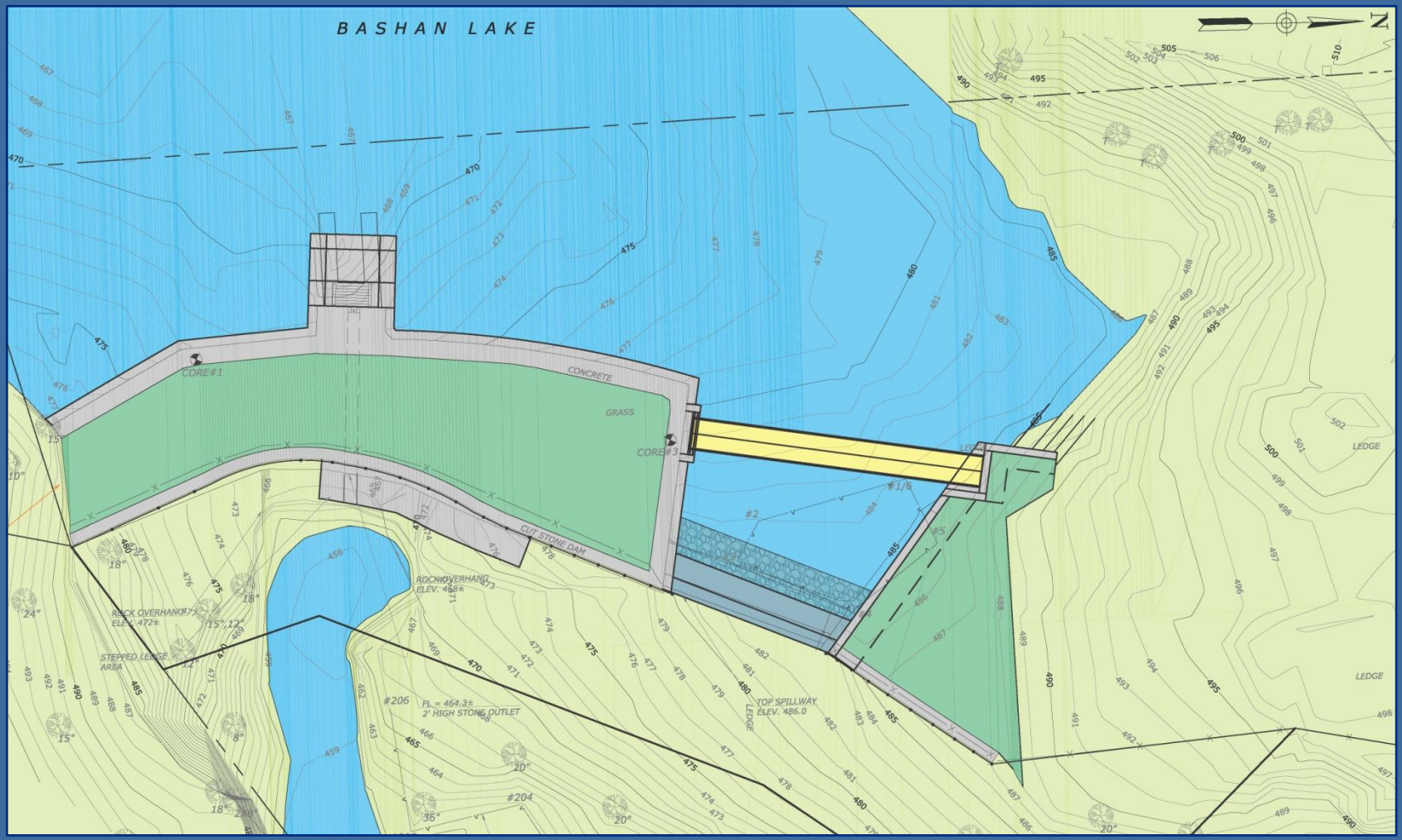


Dam Overtopping (March 2010)

Proposed Major Repair Components

- Replace existing gate structure
- Raise dam embankments one foot to provide one foot of overtopping freeboard for the 100 year design flood
- Install new full-height concrete cut-off wall along upstream right embankment to correct repetitive concrete deterioration

New Right Embankment Cut-Off Wall



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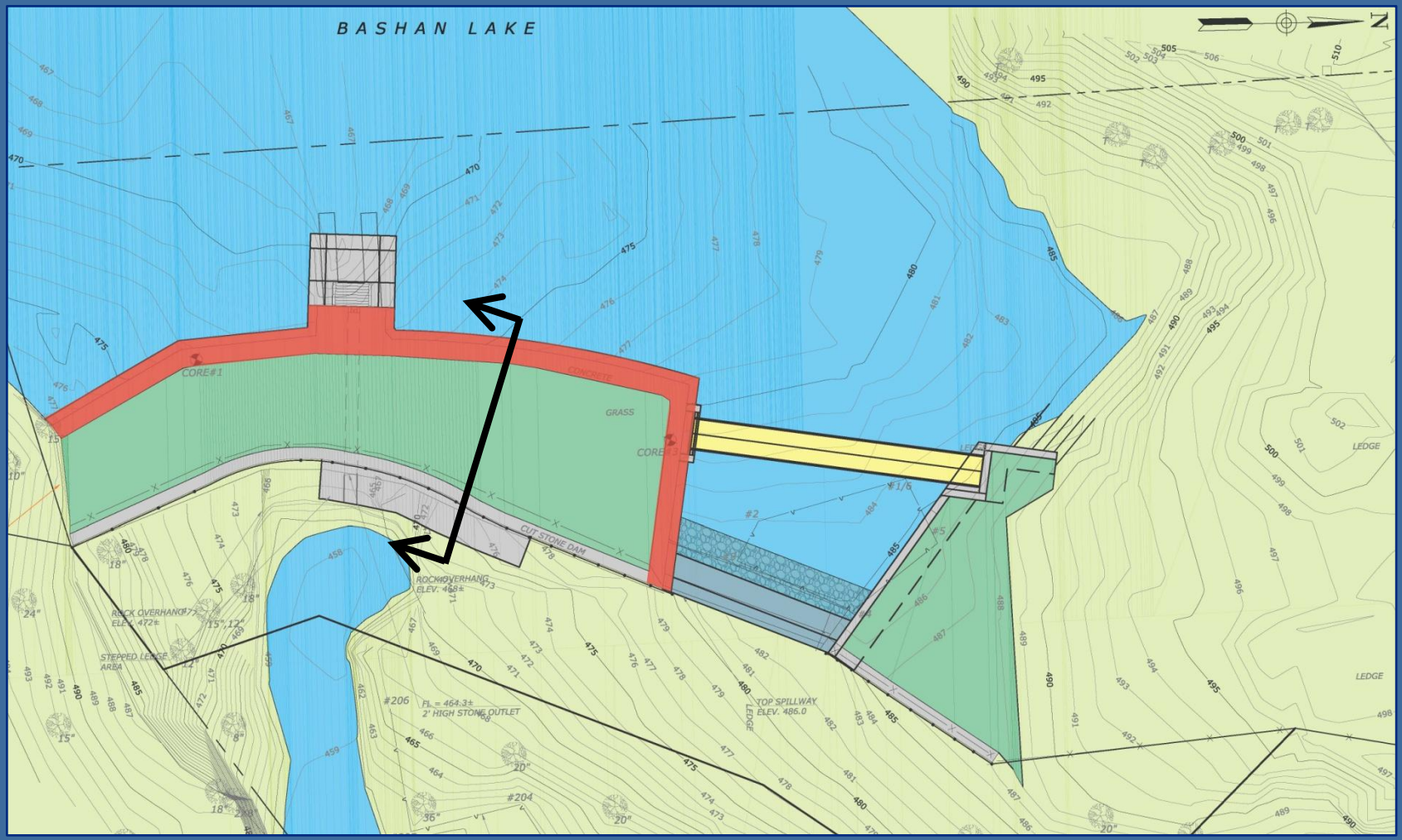

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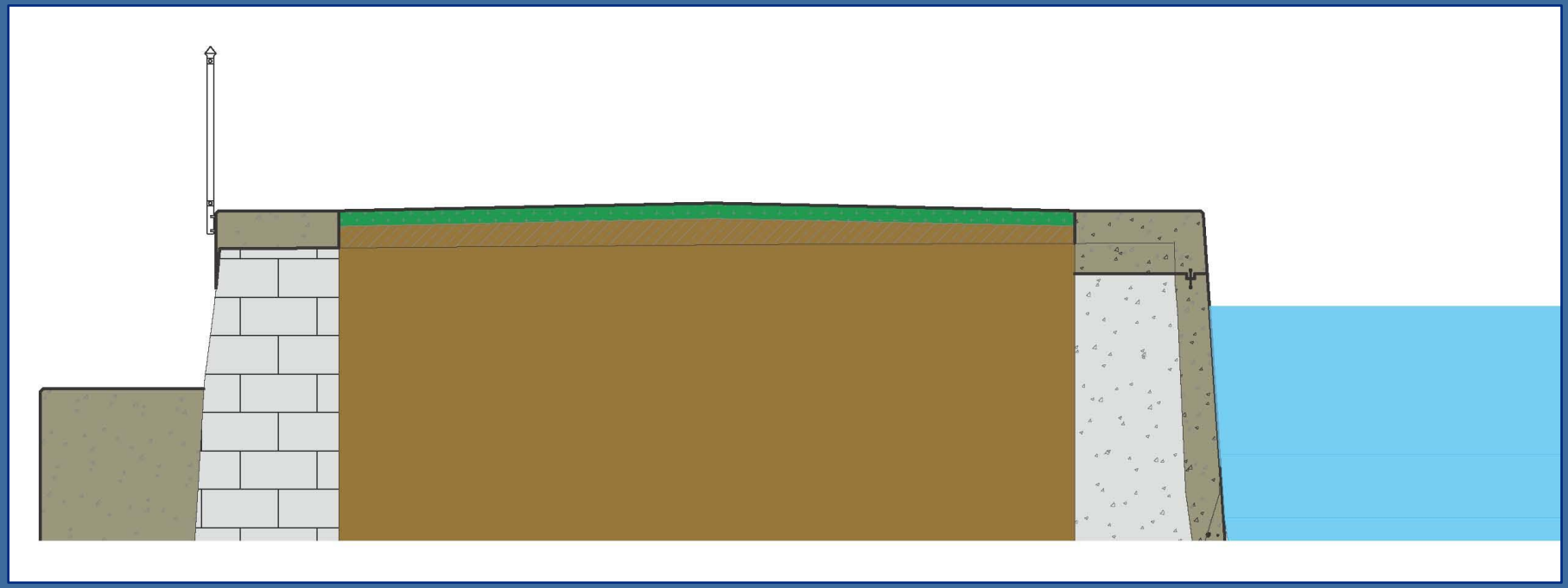

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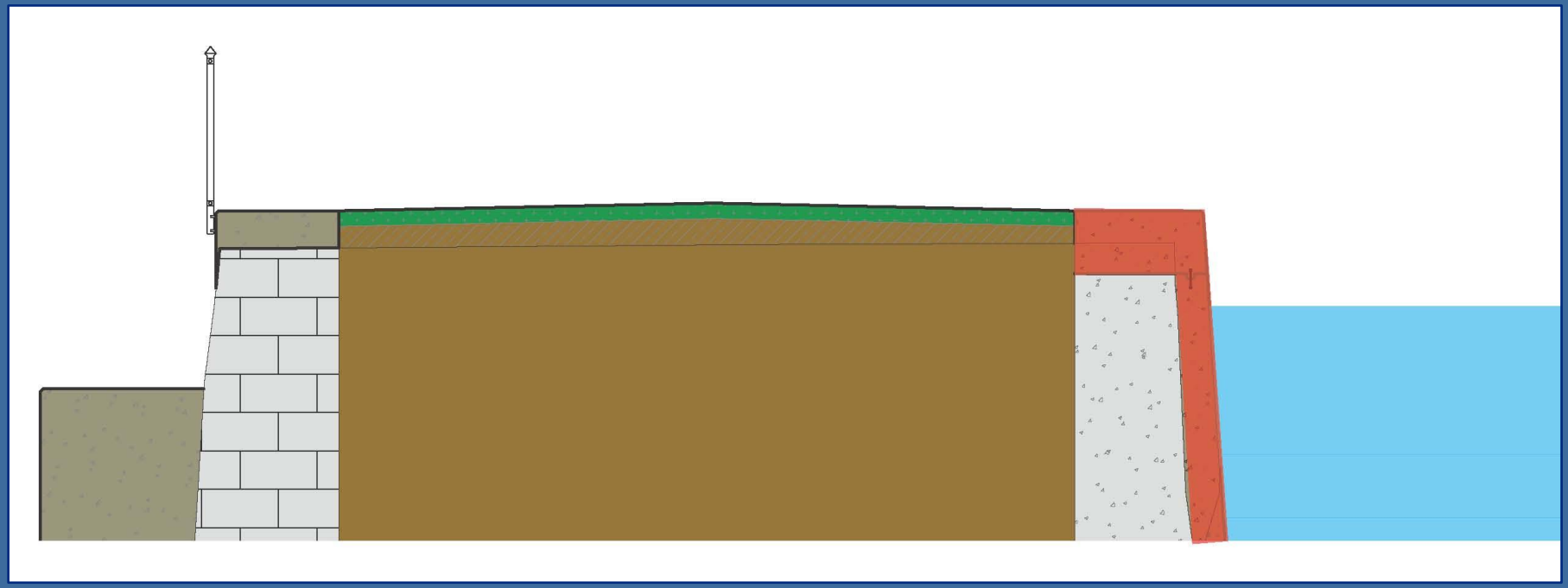
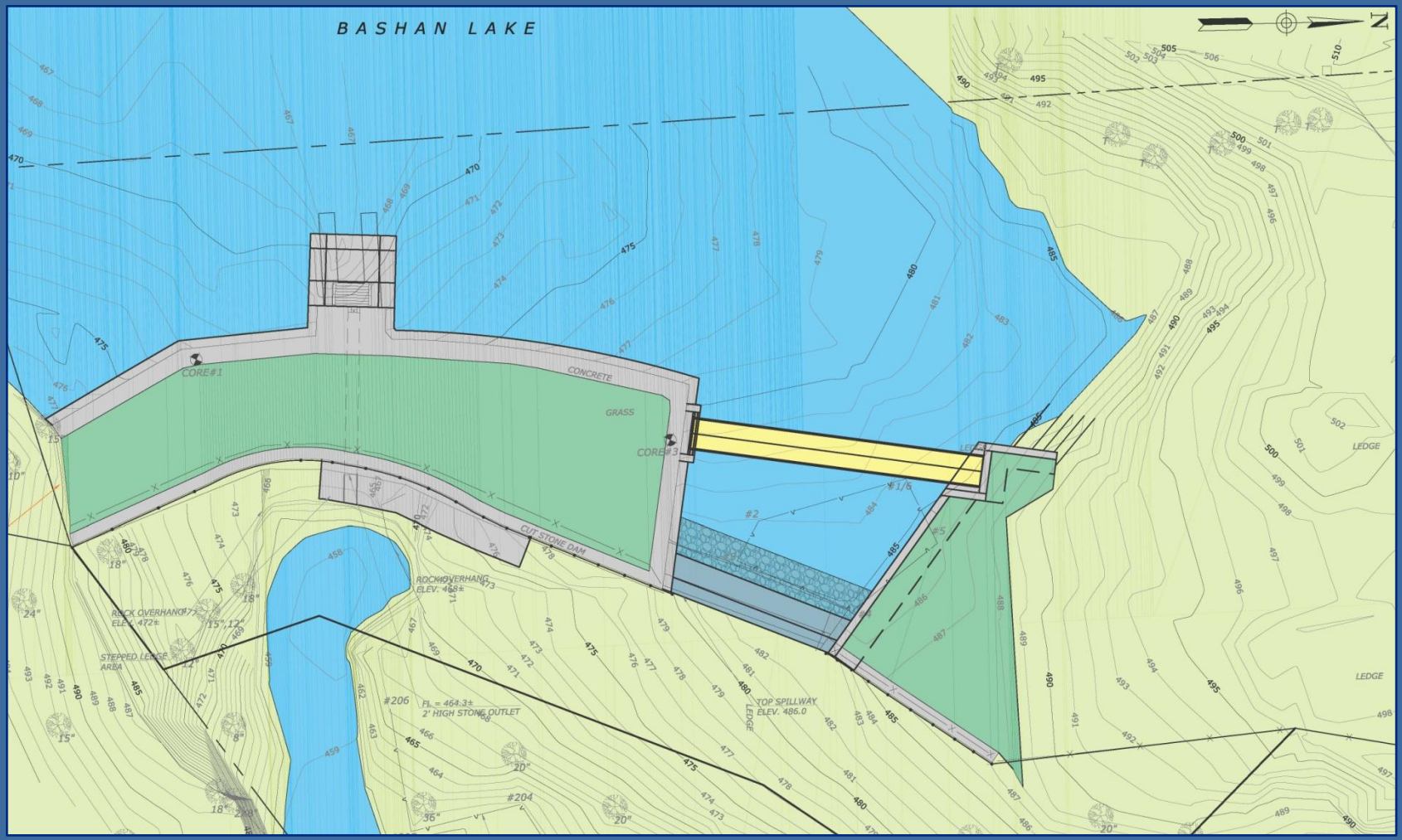


Spalling Concrete

Proposed Major Repair Components

- Replace existing gate structure
- Raise dam embankments one foot to provide one foot of overtopping freeboard for the 100 year design flood
- Install new full-height concrete cut-off wall along upstream right embankment to correct repetitive concrete deterioration
- Reconstruct spillway cut-off wall for existing seepage

Reconstruct Spillway Cut-Off Wall



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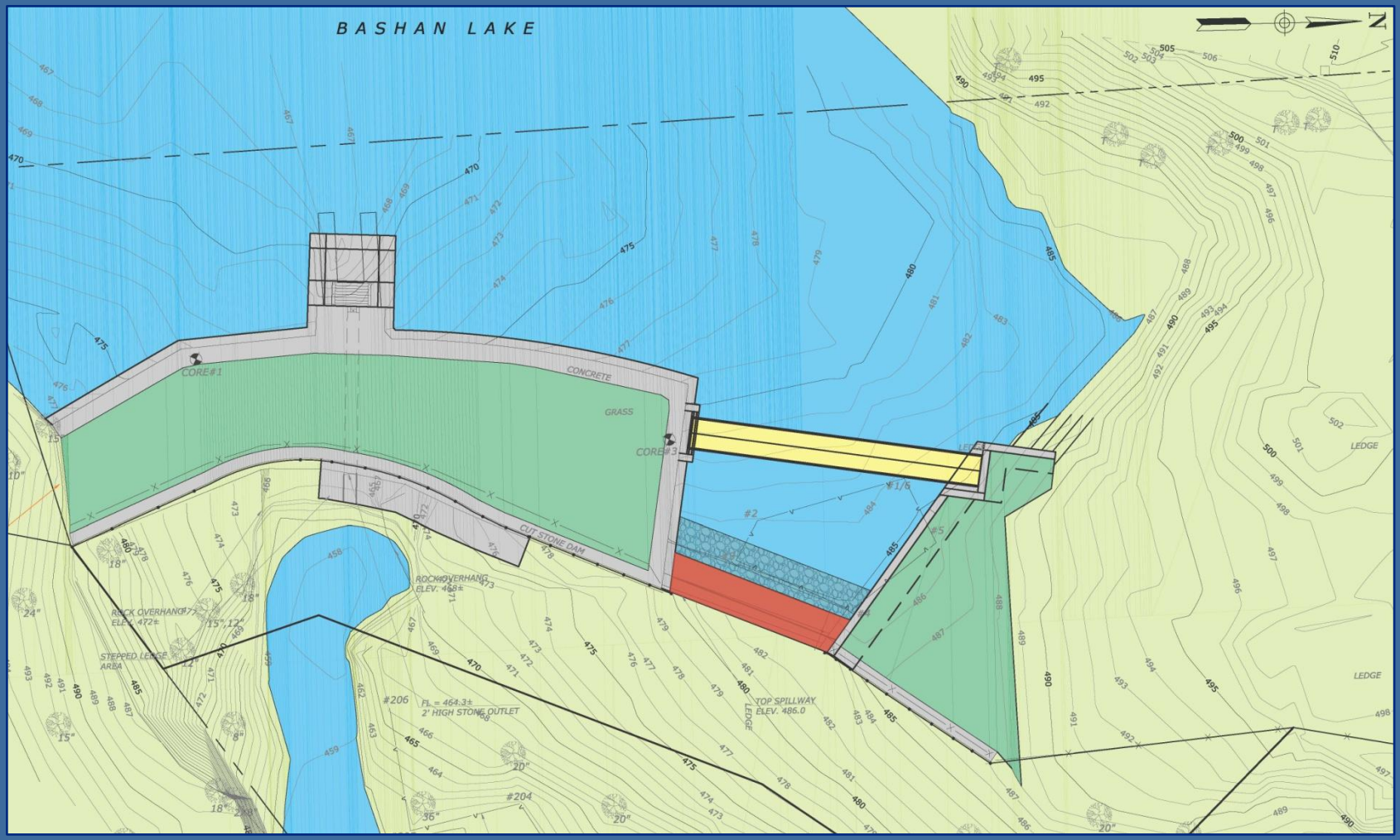
Reconstruct Spillway Cut-Off Wall



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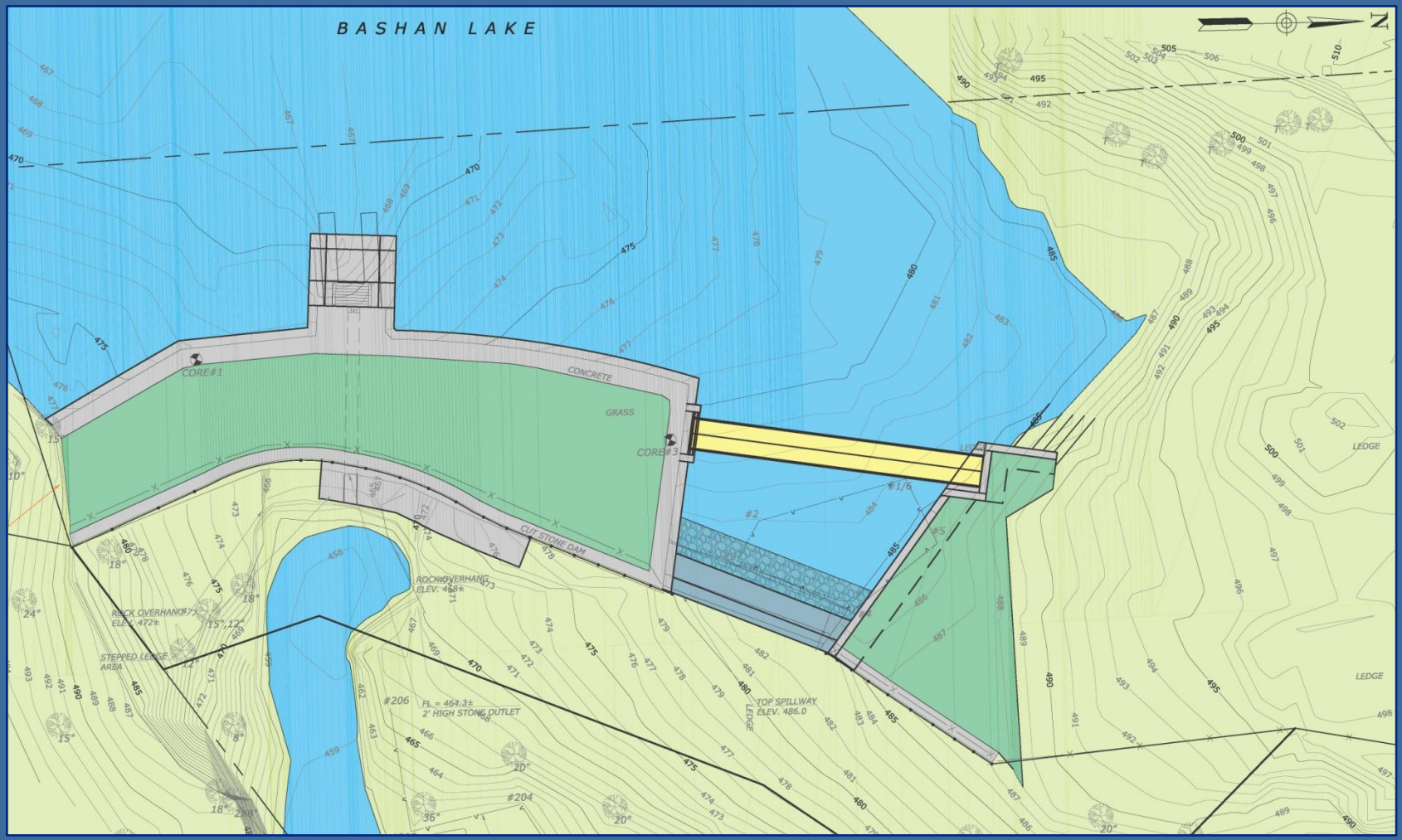
Downstream Spillway Face

Existing Spillway Seepage

Proposed Major Repair Components

- Replace existing gate structure
- Raise dam embankments one foot to provide one foot of overtopping freeboard for the 100 year design flood
- Install new full-height concrete cut-off wall along upstream right embankment to correct repetitive concrete deterioration
- Reconstruct spillway cut-off wall for existing seepage
- Construct new concrete buttress to reinforce downstream stone masonry wall

New Downstream Concrete Buttress



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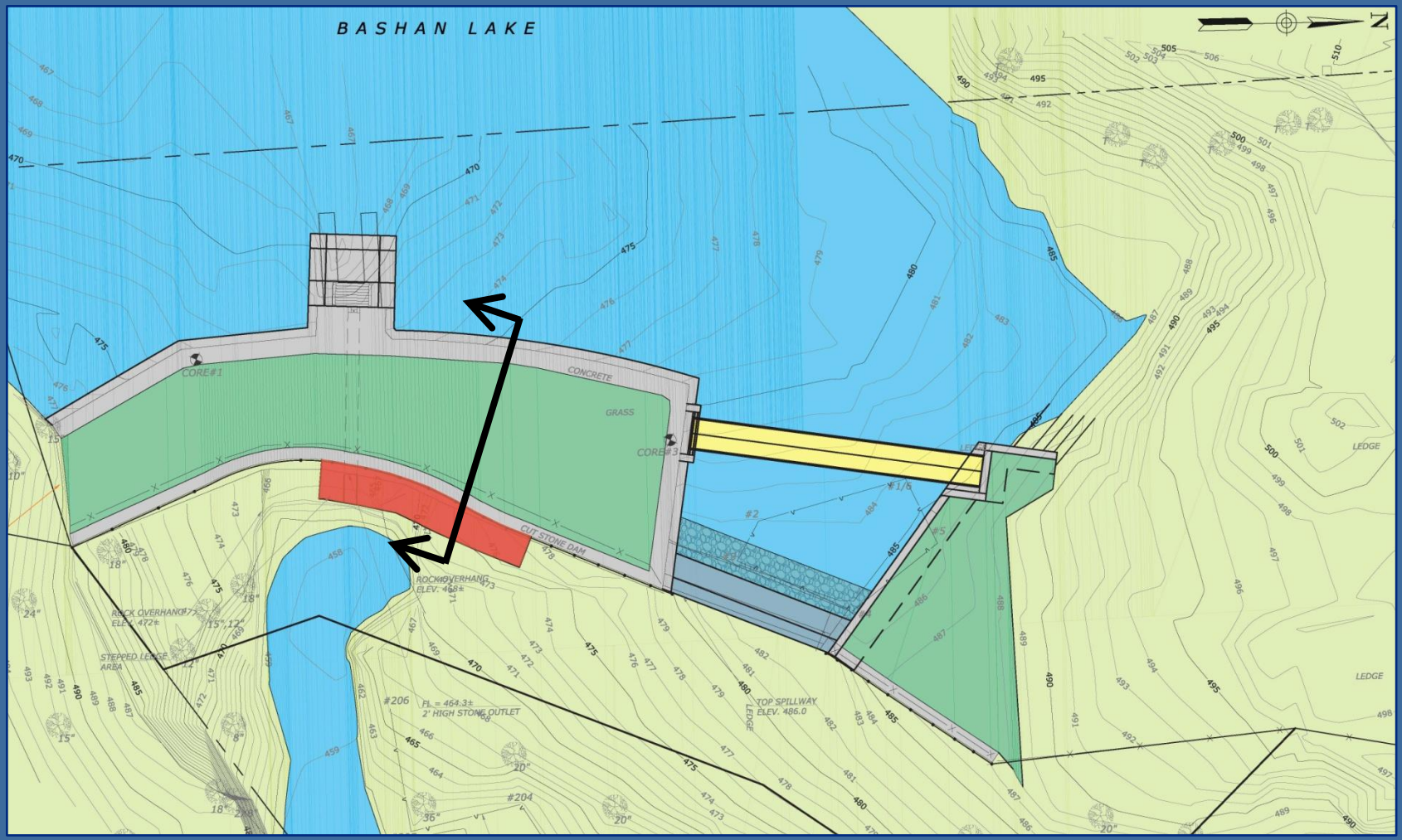

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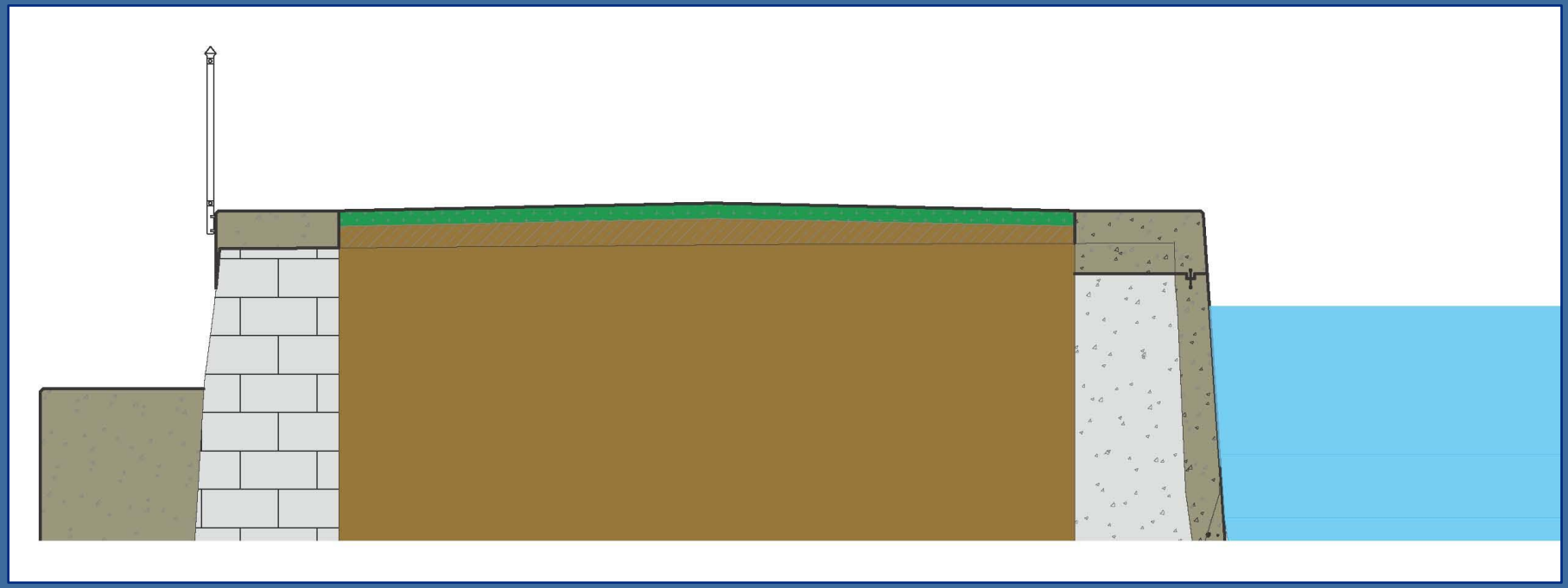

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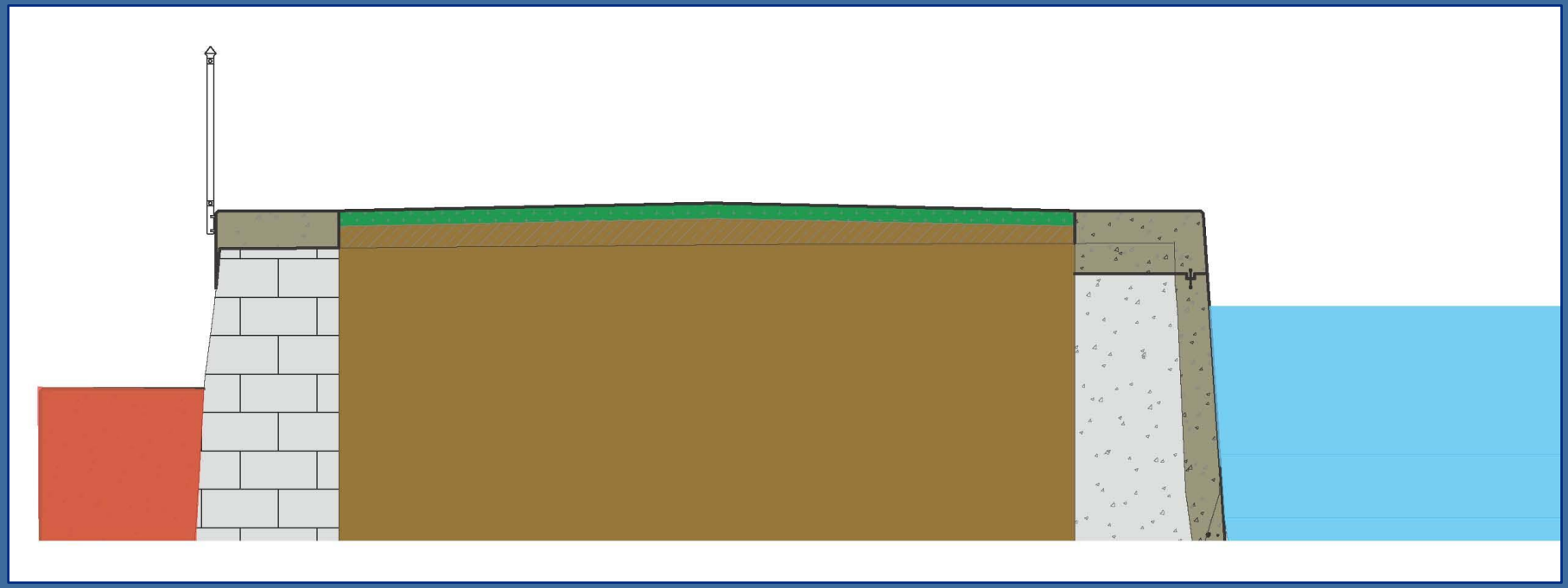
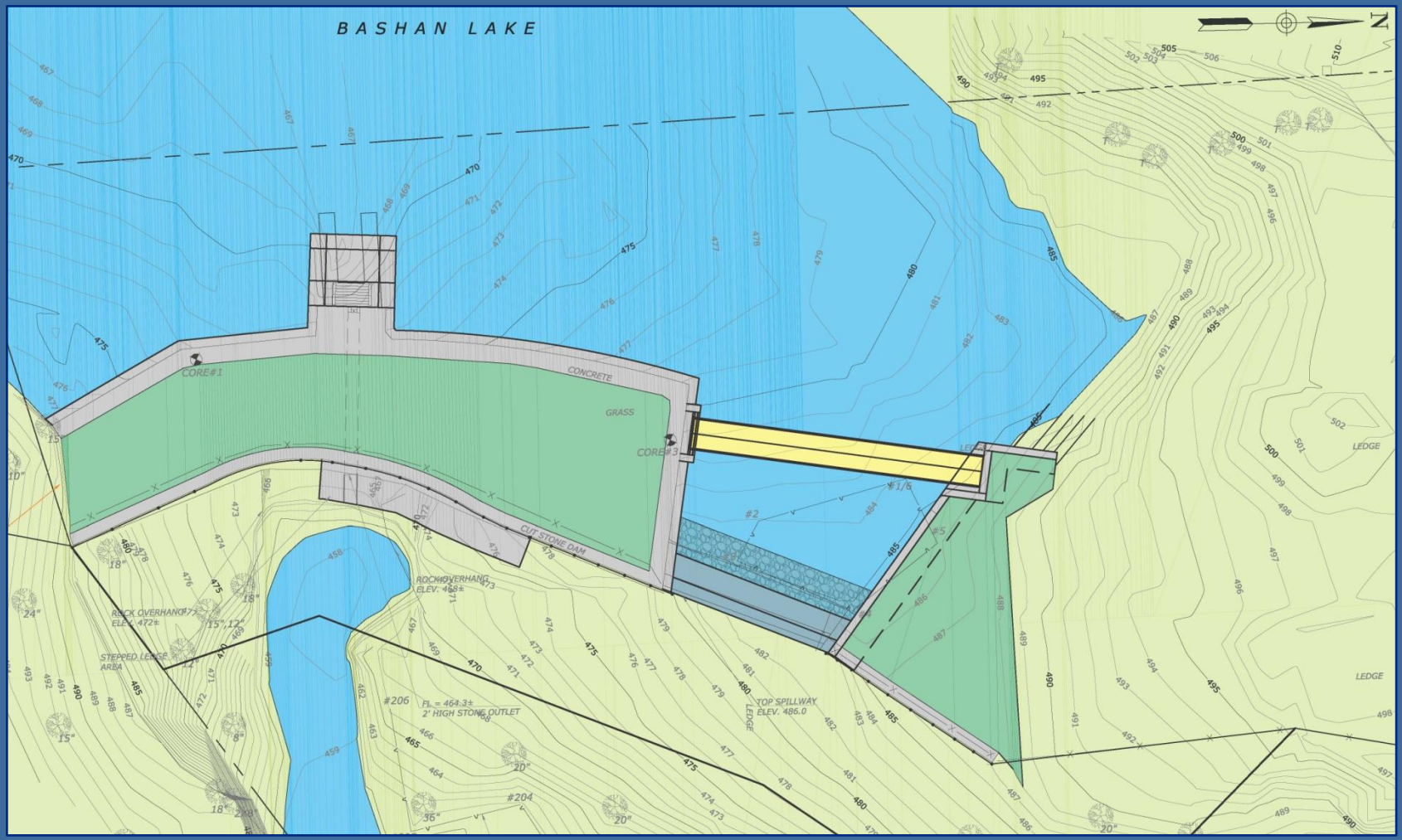


Proposed Major Repair Components

- Replace existing gate structure
- Raise dam embankments one foot to provide one foot of overtopping freeboard for the 100 year design flood
- Install new full-height concrete cut-off wall along upstream right embankment to correct repetitive concrete deterioration
- Reconstruct spillway cut-off wall for existing seepage
- Construct new concrete buttress to reinforce downstream stone masonry wall
- Install new prefabricated steel access bridge over spillway

New Maintenance Access Bridge



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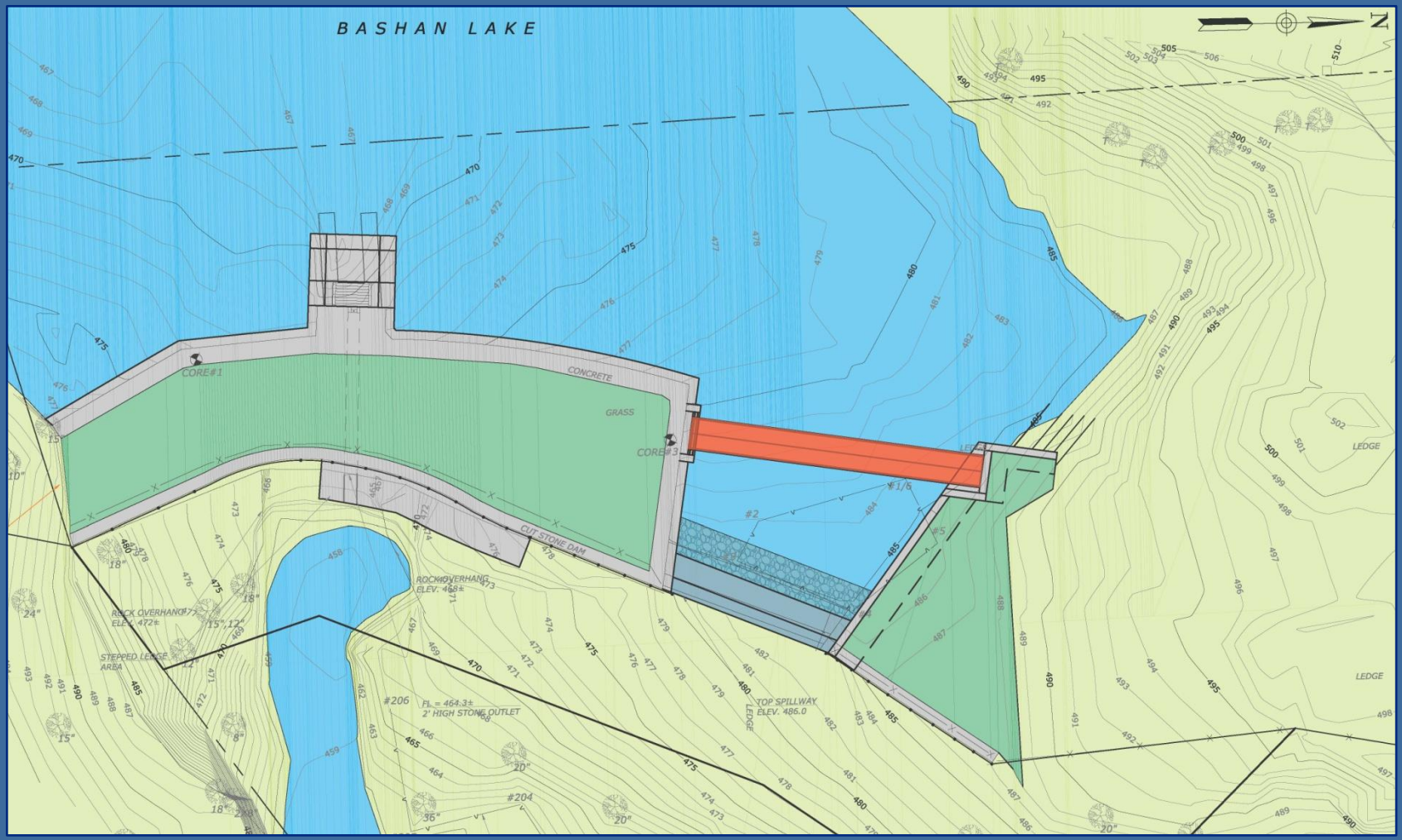
New Maintenance Access Bridge



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Typical Maintenance Access Bridge

Water Handling Options

Option A- Maintain full lake level

Option B- Approximate 5 foot lake drawdown

Option C- Approximate 13 foot lake drawdown

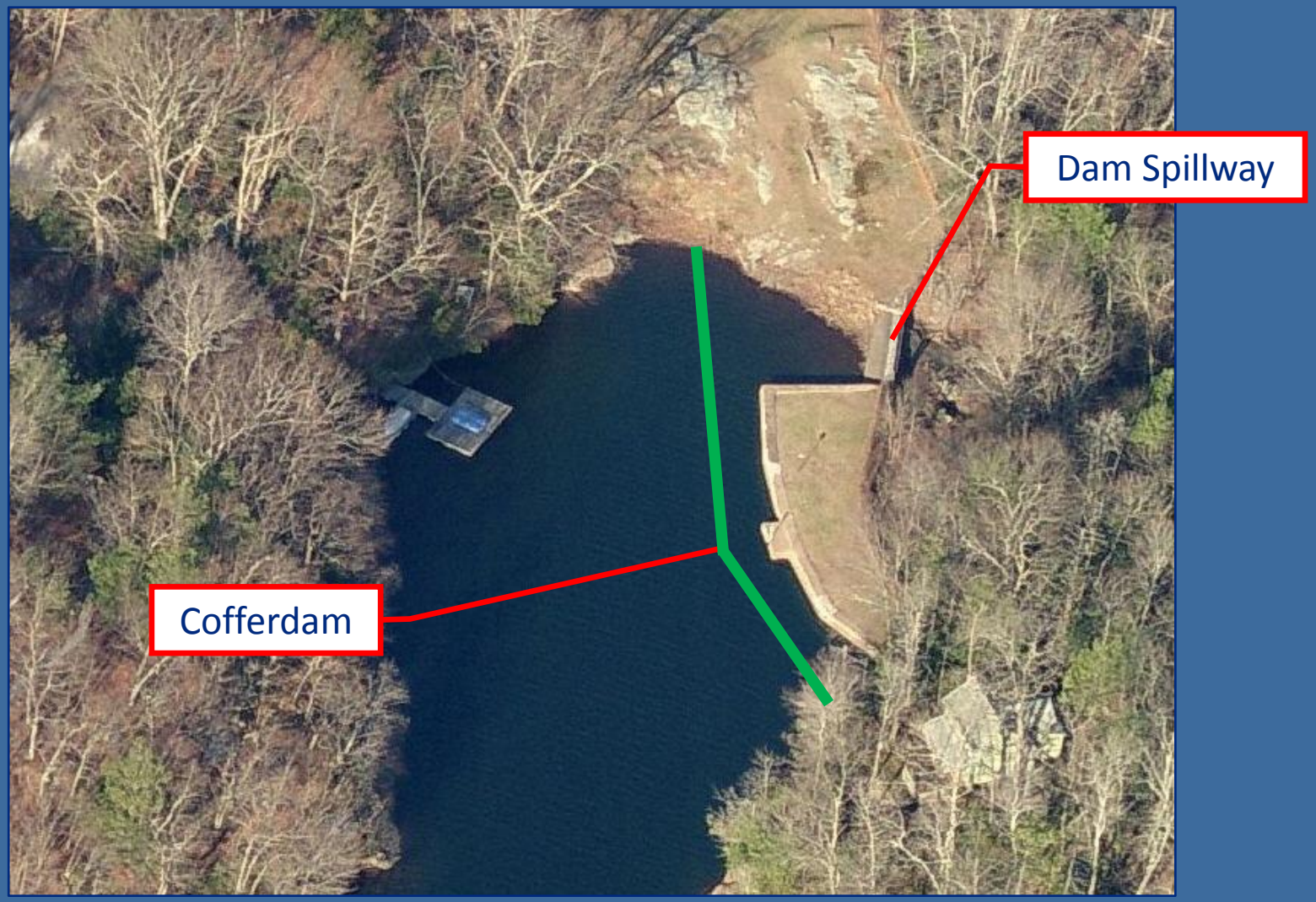
Option D- Approximate 16 foot lake drawdown

Option A Water Handling

Option A- Maintain full lake level

190 foot long, up to 25 foot high cofferdam just upstream of dam

Option A Cofferdam Location



Option A Impacts

Option A- Maintain full lake level

190 foot long, up to 25 foot high cofferdam just upstream of dam

Impacts

- Recreation- Minimal impacts
- Aquatic Vegetation- No positive/negative impacts
- Fisheries- Minimal impacts
- Abutters- Minimal impacts
- Cost- ±$750,000 (most expensive option)
- Lake Refilling- 0 months

Option B Water Handlings

Option B- 5 foot lake drawdown

120 foot long, 10 foot high cofferdam between two islands located at mouth of northerly cove

Option B Cofferdam Location

Option B Impacts

Option B- 5 foot lake drawdown

120 foot long, 10 foot high cofferdam between two islands located at mouth of northerly cove

Impacts

- Recreation- ±1 foot down first summer
- Aquatic Vegetation- Potentially more growth
- Fisheries- Reduced impacts to Bridle Shiner
- Abutters- Primarily limited to first spring
- Cost- ±$150,000 (second most expensive option)
- Lake Refilling- ±10 months

Option C Water Handling

Option C- 13 foot lake drawdown

Install stop logs in existing cofferdam located between two islands at mouth of northerly cove

Existing Cofferdam (1983 Repairs)

Option C Impacts

Option C- 13 foot lake drawdown

Install stop logs in existing cofferdam located between two islands at mouth of northerly cove

Impacts

- Recreation- ±4ft down 1st summer, ±½ft down 2nd summer
- Aquatic Vegetation- Potentially reduced growth
- Fisheries- Possible notable impacts to Bridle Shiner
- Abutters- Notable first summer
- Cost- ±$5,000 (minimal project cost)
- Lake Refilling- ±22 months

Option D Water Handling

Option D- 16 foot lake drawdown

Utilize existing cofferdam located between two islands, without stop logs

±16 Foot Drawdown (1983)

±16 Foot Drawdown (1983)

Option D Impacts

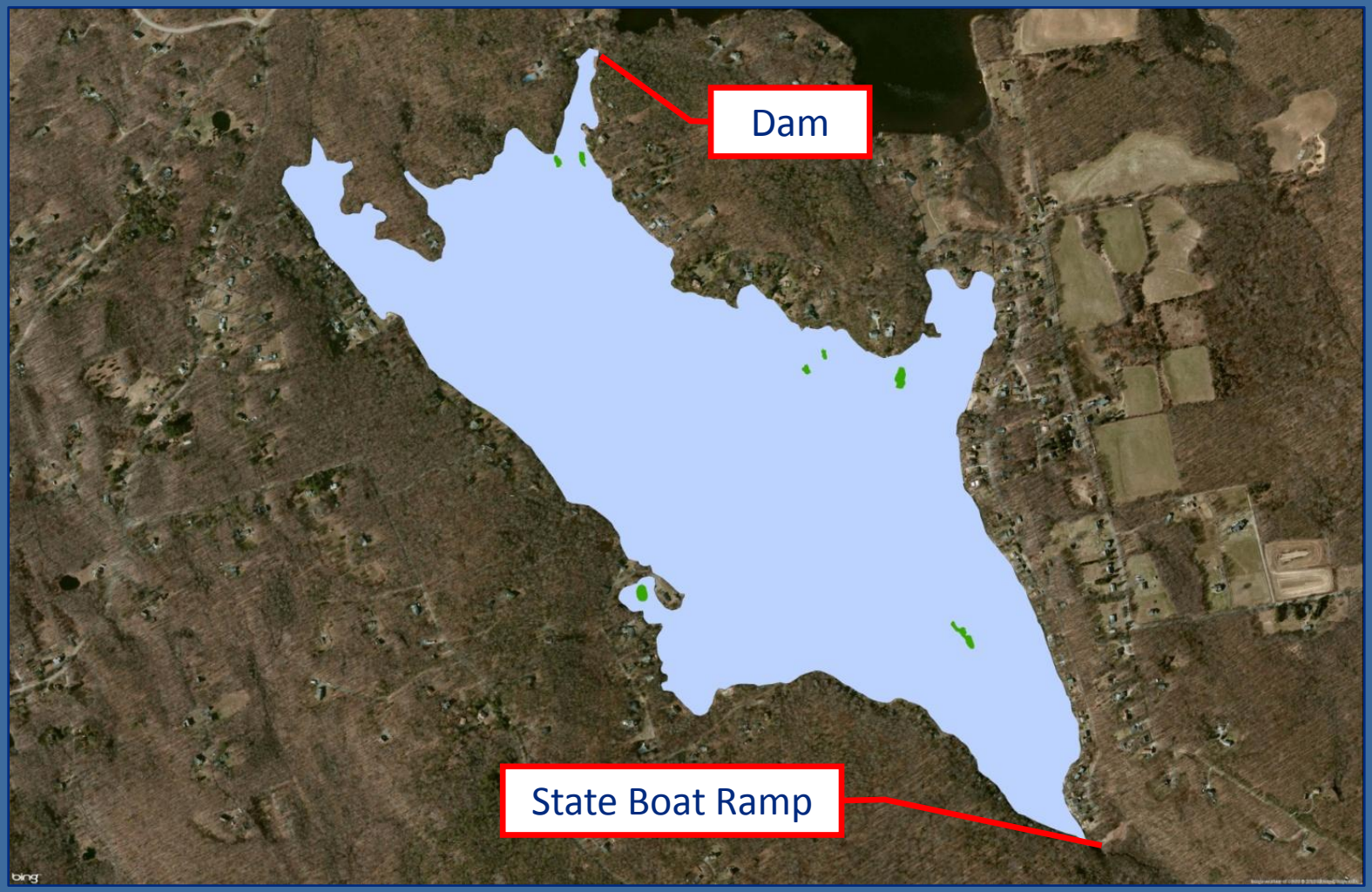
Option D- 16 foot lake drawdown

Utilize existing cofferdam located between two islands, without stop logs

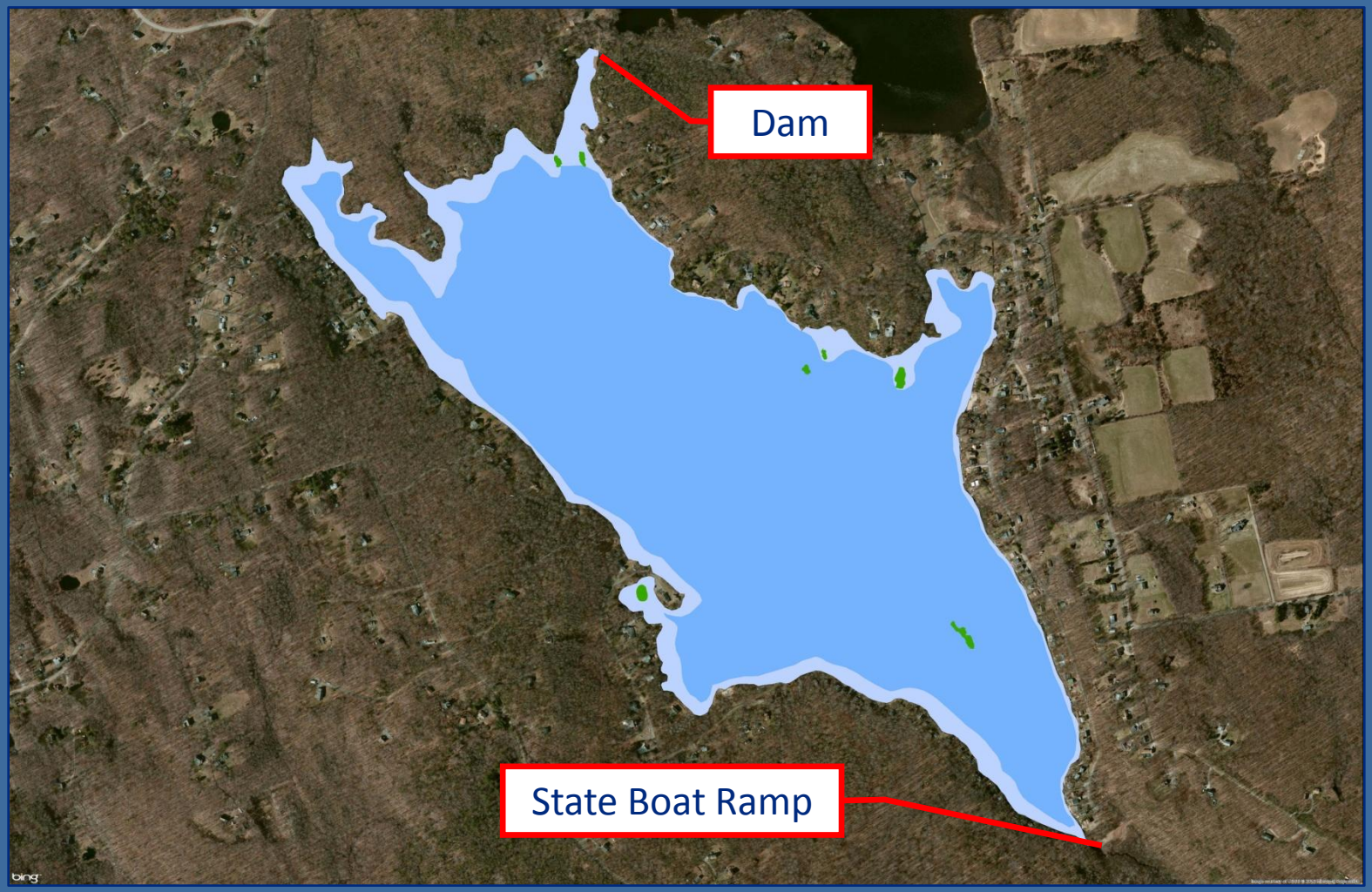
Impacts

- Recreation- ±5ft down 1st summer, ±1½ft down 2nd summer
- Aquatic Vegetation- Potentially reduced growth
- Fisheries- Possible notable impacts to Bridle Shiner
- Abutters- Notable first summer, minor second summer
- Cost- ±$0 (minimal project cost)
- Lake Refilling- ±25 months

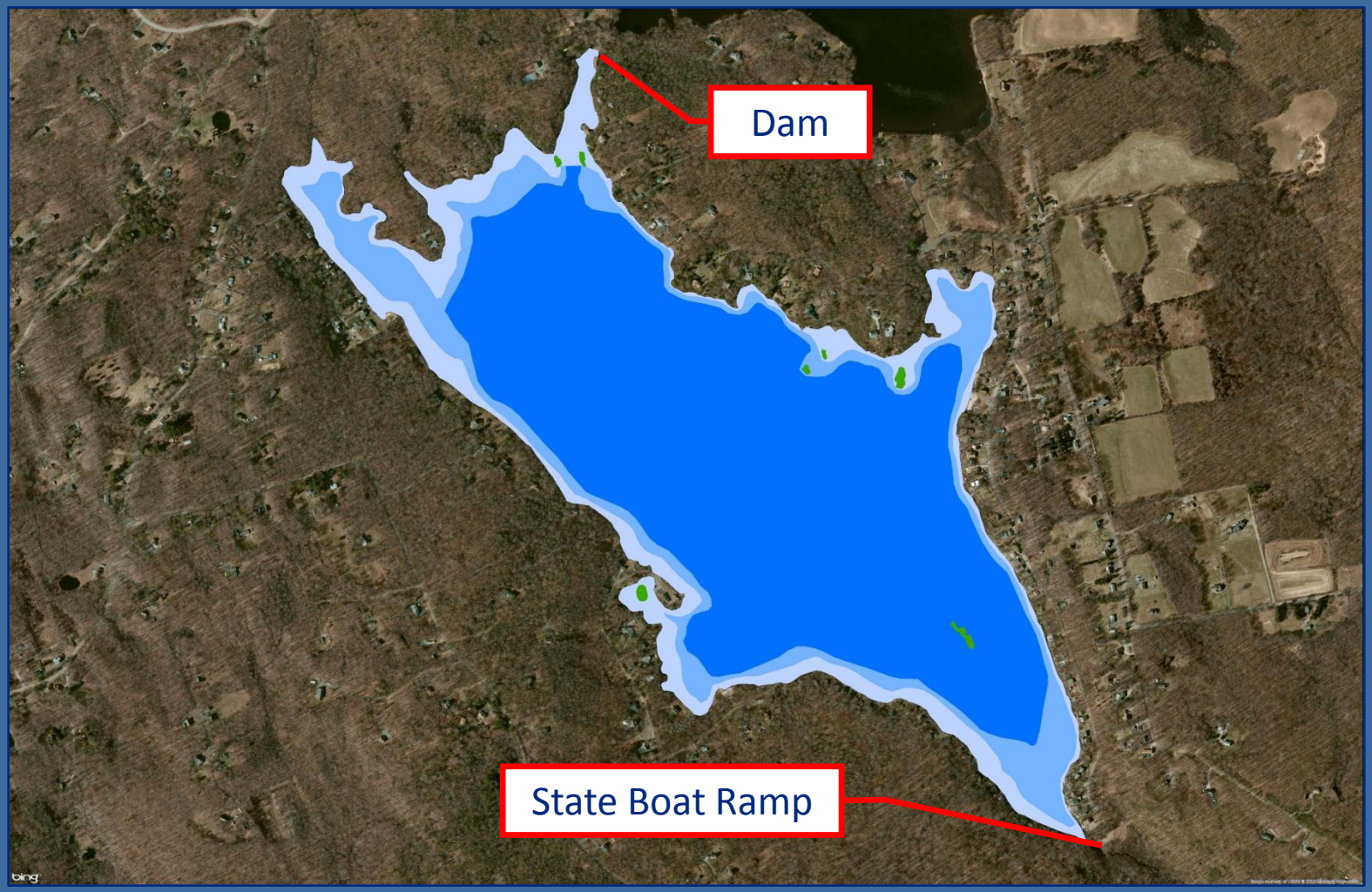
Option A- Full Lake Level



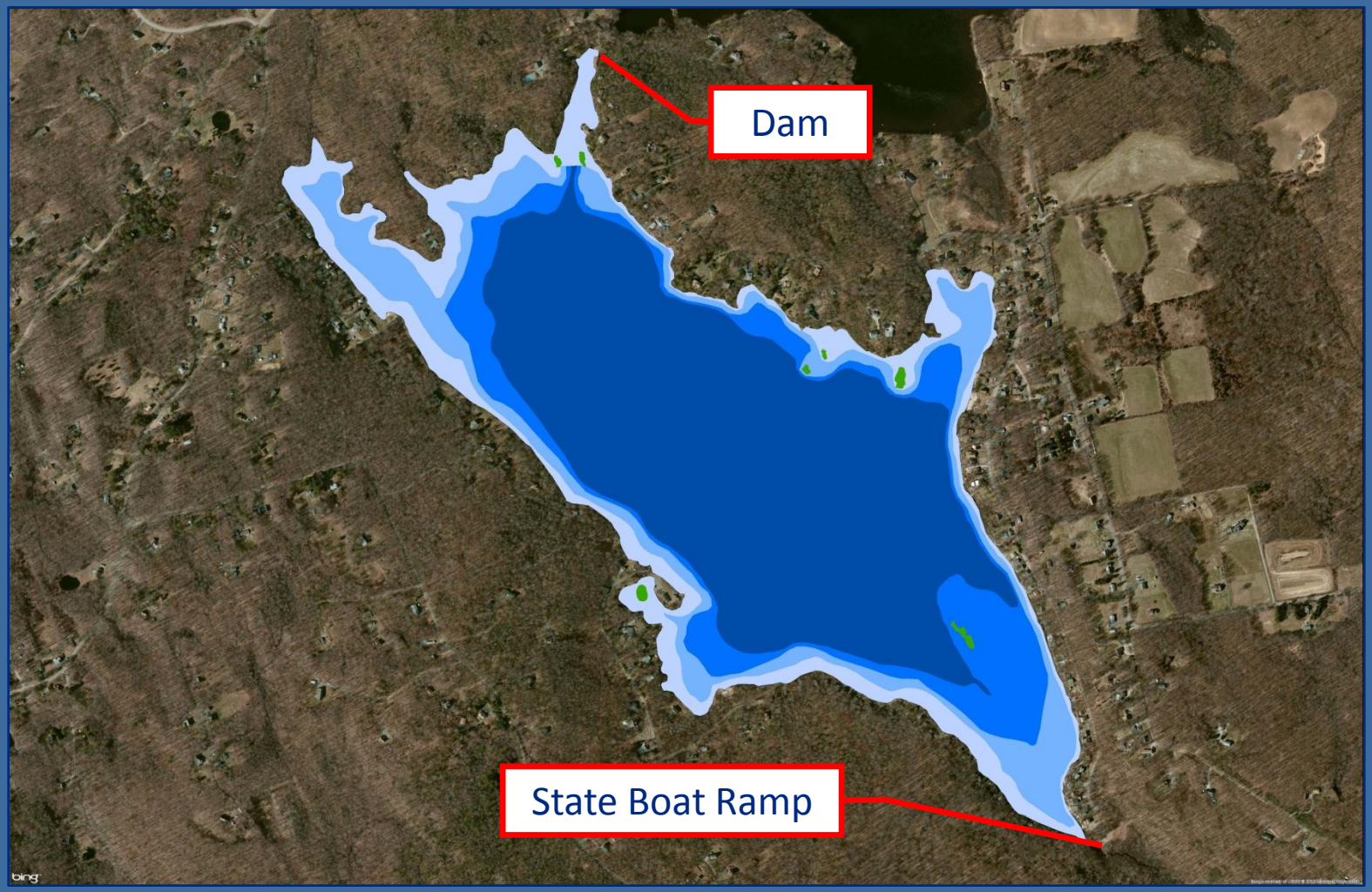
Option B- 5 Foot Lake Drawdown



Option C- 13 Foot Lake Drawdown



Option D- 16 Foot Lake Drawdown



Water Handling Summary

Impacts	Water Handling Options			
	A 0 ft	B -5 ft	C -13 ft	D -16 ft
Recreation	++	+	-	- -
Vegetation	0	- -	+	++
Fisheries	++	+	-	- -
Abutters	++	+	-	- -
Cost	- -	-	++	++
Lake Refilling	++	+	-	- -

++ Notable Positive Impact -- Notable Negative Impact

+ Positive Impact - Negative Impact

0 Neither Positive nor Negative Impact

Project Schedule

- Start Lake Drawdown- Day after Labor Day, 2014
- Start Lake Refilling- No later than February 1, 2015
- Total Estimated Construction Duration- 6 Months
- Construction Estimate- $1.2 million (excluding water handling)

DEEP Contact

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Questions?